

ALEXSEYEVSKIY, K.M.

Device for simplifying work with the C-5 magnet. Biul. nauch.-
tekh. inform. VIMS no.2:71 '63. (MIRA 18:2)

1. Belgorodskaya zhelezorudnaya ekspeditsiya Geologicheskogo
upravleniya Tsentral'nykh rayonov.

Aleksandrovskiy, K. N.

7749 Osvobodivshaya kul'tury. Po Red. A. I. Smirnova. Sankt-Peterburg, m.
1954 112 s. s ill. 12 sm. (V perosheh' slushatel'nykh
spekhtatnikh soprozootekhn. kursov). 10,000 ekz. 3r. 10k. 7 per.
(55-3746) 635(47.6)(02)

80. Knizhnaya Letopis', Vol. 7, 1955

ALEKSEYEVSKIY, N. A.

Jul 23

MINER/Mine
Mining Methods
Bancite

"Rapid Cutting of Drifts at the North Ural Bancite Mines," N. A. Nifantov, N. P. Kuntin, N. A. Golosovskiy, Engineers, 5 pp

"Gor Zhur" No 7

Refers to success in decreasing time required for rapid cutting of drifts. Rapid cutting of 17 drifts was carried out in 1943-1947 at subject location. Describes cutting at various times, disclosing technical operations, speed, etc. Gives three tables with data on cutting operations.

82
PA 13/49154

1. ALEKSEYEVSKIY, N. A., Min. Eng. - YAZOV, D. G., Min. Eng.
2. USSR (600)
4. Mining Engineering
7. Experience with rapid mining of rising stopes. Gor zhur. No 12 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

ALMEKTEVSKIY, N.A.

Investigating the driving of shafts in bauxite mines. TSvet. met.
26 no.2:5-11 Mr-Apr '53. (MLRA 10:9)
(Bauxite)

ALEKSEYEVSKIY, N. A.

ALEKSEYEVSKIY, N.A.; PONOMAREV, B.M., redaktor; PARTSEVSKIY, V.M.,
redaktor.

[Dissemination of practice in rapid excavation work in northern
Ural bauxite mines] Obobshchenie opyta skhrostaego provedeniia
gornykh vyrabotok na Severoural'skikh boksitovykh rudnikakh.
Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi
metallurgii, 1954. 115 p. (MLRA 7:8)
(Mining engineering) (Ural Mountains--Bauxite) (Bauxite--
Ural Mountains)

ALEKSEYEVSKIY, N.A., gornyy inzhener

[illegible]

Bar timbering in bench working of longwall. Gor.shur. no.3:18-19

Mr 155.

(MLRA 8:7)

(Ural mountains-- Mines and mineral resources)

KOSTIN, M.P., gornyy inzhener; GUSAROV, M.I., gornyy inzhener; ~~ALEKSEYEVSKIY~~,
N.A., gornyy inzhener; STADNICHENKO, A.P., gornyy inzhener.

Drift mining at a speed of 302 meters per month. Gor.shur.no.9:12-15
S '56. (MIRA 9'10)

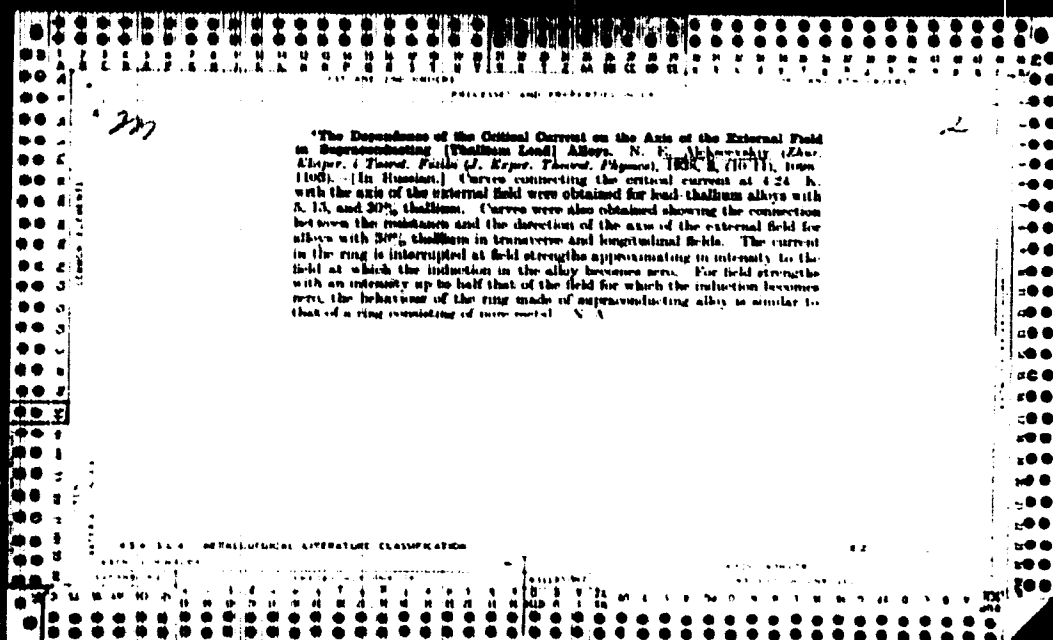
1.Severoural'skiye boksitovyye rudniki.
(Ural Mountain region--Bauxite) (Mining engineering)

ALEKSHYEVSKIY, Nikolay Aleksandrovich; SELEDKOV, Yu.V., red.; PARTSEVSKIY,
V.M., red.isdatel'stva; KARASEV, A.I., tekhn.red.

[Progressive work methods of secondary mining in North Ural
bauxite mines] Peredovye metody truda pri ochistnoi vyezke na
severoural'skikh boksitovykh rudnikakh. Moskva, Gos.nauchno-
tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957.
72 p.

(MIRA 11:1)

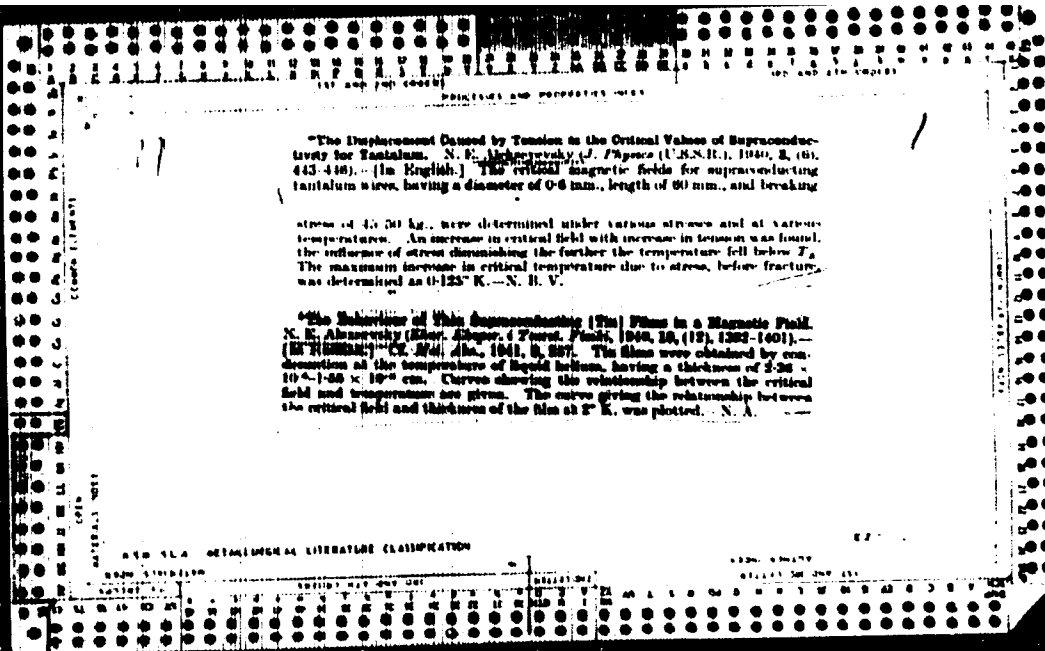
(Ural Mountains--Bauxite)



ABRAMSON, M. S.

"Magnetic Properties of Thin Superconductive (Ti) Films,"
 Ceyhan, Journal de l'Académie de Sciences URSS; also in Bulletin of
 the Academy of Sciences USSR, 1959, Vol. 24, No. 1, pp 27-30,
 (Kurchatov Physico-Technical Institute). In English: available at
 Battelle Memorial Institute.

"Determinations were made of the critical fields of which tin films
 of various thicknesses become superconductive. The films were obtained
 by evaporation in vacuo, the apparatus being at the temperature of liquid
 helium. It was found that the critical field increases only very slowly
 with decrease of thickness of the film to about 10^{-5} cm., when it is
 2-3 times the critical field for massive tin; but that at thicknesses
 below 10^{-5} cm. the critical field increases very rapidly, being at
 30 times that for massive tin when the thickness approaches 10^{-6} cm."



LIASHENIN, N. V.

"The Influence of the Shape of the Specimen on the Hysteresis in the Phenomenon of Superconductivity," Journal of Physics (Moscow), 1961, Vol. 1, pp 311. In English.

Abstract of a paper presented at a Conference on Low-Temperature Physics, Moscow, 1961. If a superconducting disc is hung in a magnetic field, the curve of its deflection, dependant on the outside field, discloses a strong hysteresis. The reasons for this hysteresis were investigated. It was found that during the repeated transition of the disc into a superconducting state, the central part remains non-superconducting so that the disc becomes similar to a ring superconducting ring. By means of iron filings, the topography of the residual field in the disk was measured, and showed that the center of the disk is due rather to flow in a ring. In view of the fact that the film disc gives a residual field, it seems probable that the so-called 'screen-in' field in a hollow cylinder, discovered at Leiden, is of a similar nature. This view is supported by the fact that the field in a cylinder in the direction of the field, or if it is a hollow cylinder perpendicular to the field, there is no change in the magnitude of the residual field. Moreover, for a hollow cylinder of the dimensions 10 mm diam., there was no change in the above-mentioned field, even if the case was split 50 x 2 mm. was cut in the direction of the field, through the center of the cylinder. In the case of a hollow cylinder,

ALLEN, J. H.

Page 2

through the sides of the cylinder. In the discussion, I. R. Kliban states that the distribution of the superconducting and non-superconducting regions from a flat disc could also be found by means of a direct measurement of the topography of the resistance in a transverse direction at various points of the disc."

ALEXSEYEVSKIY, N. E.
ALEKSEYEVSKIY, N. E.

478 537.312.62
The behaviour of thin superconducting films in
magnetic fields. ALEXSEYEVSKIY, N. E. J. Phys.
U.S.S.R., 4, 5, pp. 401-410, 1941. The effect of mag-
netic fields on thin superconducting films of pure
Sn (2.36×10^{-5} to 1.55×10^{-6} cm. thick) obtained
by condensation at the temperature of liquid He was
investigated. Directly after condensation, films have
considerably higher critical fields than after they
have been heated to room temperature. The critical
field is plotted against temperature, and against
thickness at 2° abs. The films have larger critical
fields than massive Sn, and the critical field increases
the thinner the film.
A. J. M.

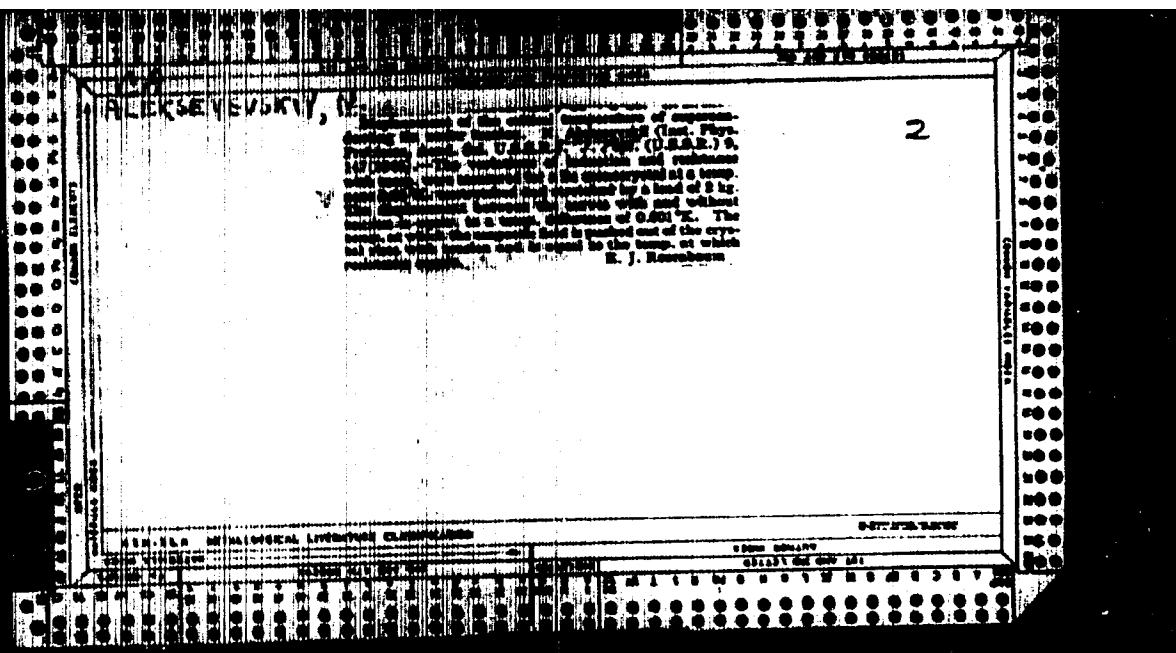
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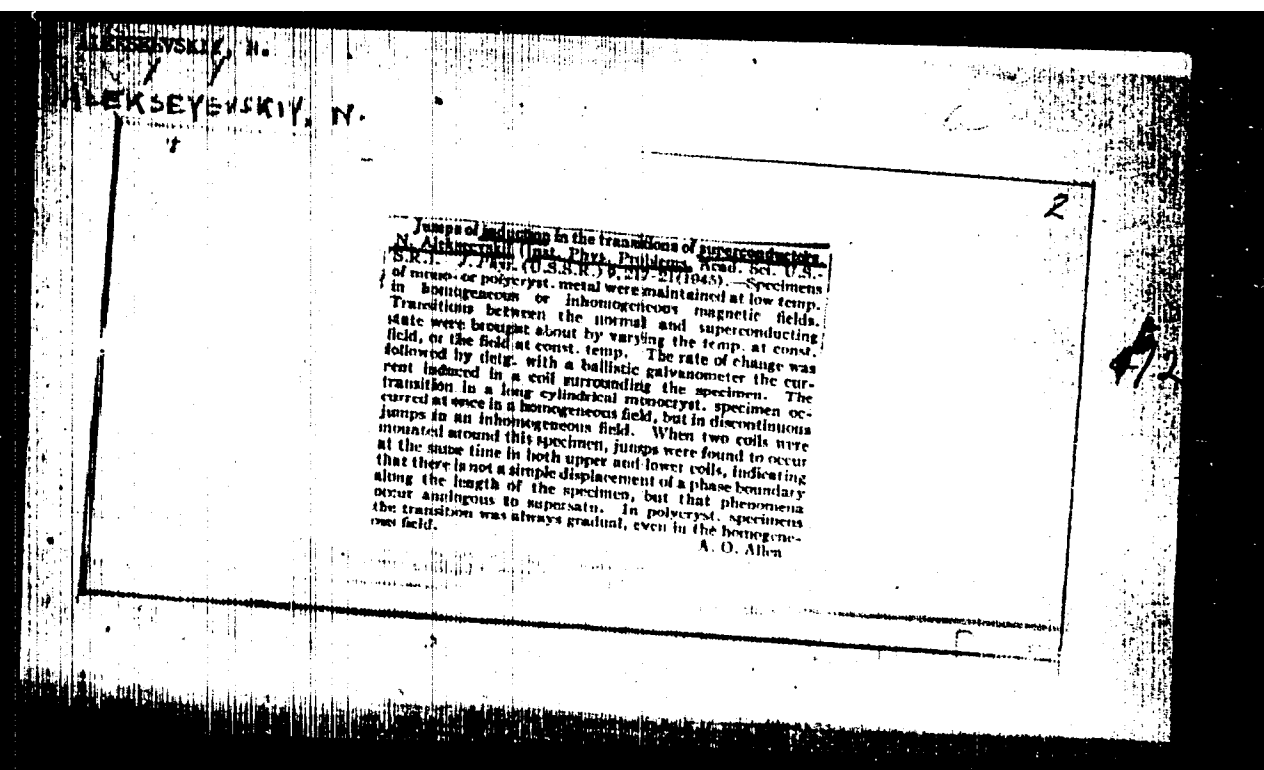
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ALBCHENKOVSKIY, N. S.

"Critical Fields of Superconductive Vanadium," *Comptes Rendus of the Academy of Sciences of the USSR*, 1961, Vol. 21, No. 4, pp. 827-828, (Ukrainian Physical-Technical Institute, Kharkov). In English; available at Battelle Memorial Institute.

"A small plate of vanadium was attached to a glass rod supported by a quartz fiber. This assembly was placed in a glass tube filled with helium at low pressure, and the whole was put in a Dewar vessel filled with liquid helium. When the external field was applied the specimen oriented itself parallel to the field. The value of the field at which the specimen returned to the equilibrium position was the critical field value. The value of dH_c/dT derived from the plotted curve was 2400 gauss/K. This value exceeds considerably the values for superconductive metals. The critical temperature (by extrapolation) was 4.73°K. This is 0.93°K. more than the value observed by Missner and Westerkoff (ibid. Nos., 1954, 1, 400). The discrepancy can be attributed either to the use of extrapolation or to internal stresses in the metal (the specimen was rolled)."

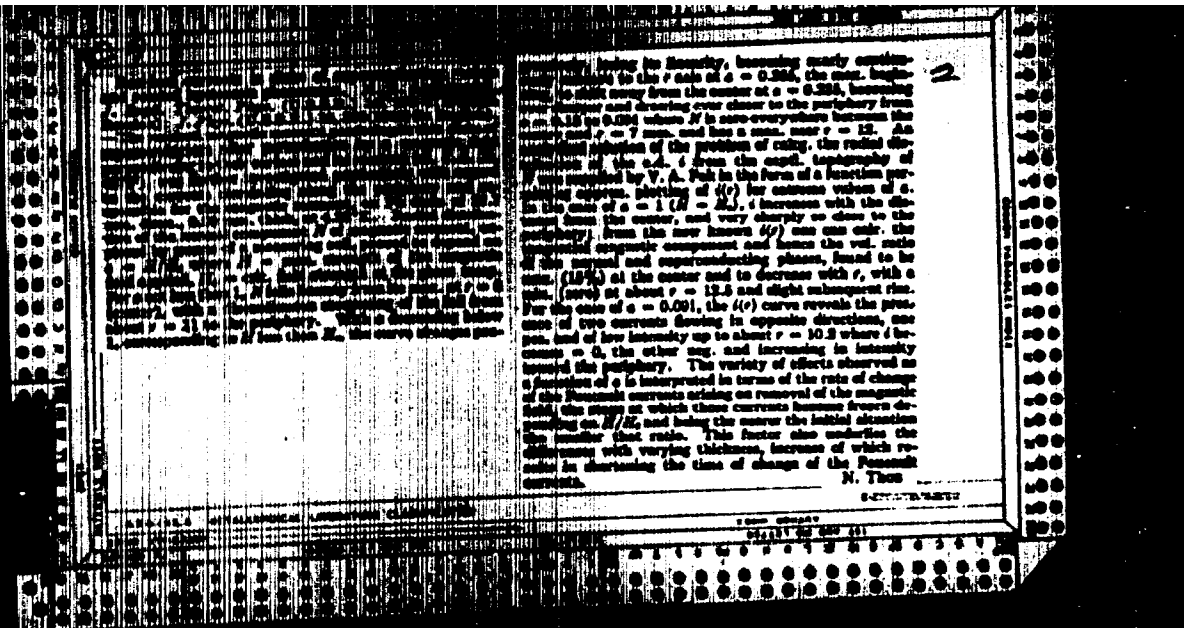




ALEXEYSKY, N.

/VI

On the Displacement of the Critical Temperature of Superconducting Tin by
Extension. N. Alexeyevsky (Zhur. Eksp. Teor. Fiz., 1955, 18, no. 211;
215) [In Russian] See also Abt. Abt. this vol., p. 42. The relation be-
tween temp. and the change of induction and electrical conductivity of a
single crystal of tin is demonstrated. On increasing the stress producing
extension of the crystal, the critical temp. is also increased. N. A.



ANONYMOUSITY, H. H.

"Automatic Control of the Rate of Evaporation of Liquid and Crystals," Zhurnal of Eksperimental'noi i Teoreticheskoi Fiziki, 1970, Vol. 10, No. 5, pp 341-342, (Institute of Physical Problems of the Academy of Sciences USSR.

"In liquefied H₂, O₂, Hg, or He argonator (vol. of the order of 10⁻³ l.) the temp. can be maintained const. (within 0.001°K. for several hrs. in the case of Hg) by maintaining the pressure within 0.1 mm. Hg. with the aid of a rubber tubing device inserted between the argostat and the vacuum pump, which interrupts or widens the communication with the pump with falling or rising pressure, resp. The setup works down to 10⁻³ mm. Hg pressure."

ALEKSEYEVSKIY, N. Ye.

USSR/Metals

Low Temperature Research
Superconductivity

Jan 1947

"Investigation of Metals at Temperature Below 1° K," N. Alekseyevskiy, L. Migunov,
Institute for Physical Problems, Acad. of Sciences of the USSR, 1 p 95

Journal of Physics, Vol. XI, No. 1

A description is given of the method of cooling by adiabatic demagnetization. Ballistic methods are used to measure temperature, due to the phenomenon or superconductivity. Figures are given for the lowest temperatures reached for seven metals and their critical temperatures of superconductivity. For example, uranium is found to be superconducting below 1.3°K . It is noted that metals must be chemically pure for accurate results.

ALEKSEYEVSKIY, N.

PA 417100

USSR Physics
Superconductivity
Bismuth Compounds

Jan 1948

"Superconductivity of Bismuth Compounds," N. Alekseyevskiy, 2 p

"Zhur Kaper i Teoret Fiz" Vol XVIII, No 1, pp 101-102.

Describes experiments on the superconductivity of bismuth compounds Bi_2Rh , Bi_2Rh , Bi_2Ca , Bi_2Pt , Bi_2Cr . Experiments are continuation of previous research described by author in "Journal of Physics, USSR" No 9, 1945.

417100

ALLEN, R. E.

"Rate of Transformation of Metals (Tin from the Normal to the Superconducting State," Doklady Akademii of Sciences USSR, 1961, Vol. 11, No. 1, pp. 37-38.

"A single-crystal cylinder cooled in liquid He to 1.2°K above the transition temp. to superconductivity was placed in a uniform magnetic field, and the temp. lowered; light from a polarized laser diode traced the change of current in the tin on a photographic film. The rate of transformation calculated from the results is 0.12 sec. per deg. at 3.22°, 0.11 at 2.95°, 0.09 at 2.5°, and 0.08 at 2.1°. The theory of an intermediate state is discussed."

ALEKSEYEVSKIY, N. Ye.

USSR/Nuclear Physics - Positrons
Superconductivity

May 49

"Proceedings in the Department of Physicomathematical Sciences," 3½pp.

Vest. Ak. Nauk SSSR, No. 5

Summarizes four reports given at 16 Feb 49 session of Dept. of Physicomath. Sci. on martensite transition in alloys, monochromatic positrons, and rate of change in the sun's mass. Also reviews work by N. Ye. Alekseyevskiy in superconductivity of bismuth-nickel, bismuth-rhodium and other alloys, including figures for temperature increase during compression. Gives minutes of Commission on Acoustics.

50/49T88

CA

2

Variation of the critical temperature of superconducting alloys of bismuth with the pressure. N. N. (Moscow). (Int. Phys. Problems, Acad. Sci. U.S.S.R., Moscow). (Zhur. Eksp. Teor. Fiz. 19, 228-231 (1940)).--The observation that in superconducting Bi the pressure dependence of the crit. magnetic field dH_c/dp decreases with falling temp. and its temp. dependence dH_c/dT decreases with increasing tempe. leads to the conclusion that all-sided compression should increase dH_c/dT . It could be assumed that Bi is a virtual superconductor with $dH_c/dT = 0$, and that it would become obviously superconducting when subjected to all-sided compression. Kapta. with Bi under pressures up to 1000 atm. gave, however, a neg. result. Thus tension does not necessarily result in a rise of the crit. temp. T_c , and compression in its lowering, as was observed on In and In (Keesom, et al. C.A.B. 40(1935)). follows from new expts. with an alloy of 11 non-superconducting elements, Bi-Ni, homogenized by prolonged annealing. Compared with a sample not subjected to pressure, the transition

curve of the compressed sample was shifted to higher temps. With a tensile stress of 2 kg. applied to a sample of $3 \times 2 \times 0.5$ mm., the transition was slightly shifted to lower temps. The anomalous sign of the effects of pressure and tension in Bi-Ni was further confirmed in expts. with a sample consisting of Bi-Ni with a soldered-on end of pure Bi wire; the latter shows an effect opposite to that of Bi-Ni. The effects of compression and of tension are reversible. The device of soldering Bi-Ni with pure Bi, for which the effect of pressure is known accurately, has permitted an exact determination of the pressure applied, 1000 kg./sq. cm.; with this value, one finds, for the compression of Bi-Ni, $dT_c/dp = 3.4 \times 10^{-3}$ degrees/atm., fairly close to the 6×10^{-3} degrees/atm. measured directly in tension. Bi-Rh shows the same sign of the effect of pressure as Bi-Ni, but with dT_c/dp approx. half as large. The anomaly of the effect of pressure

in Bi-Ni and Bi-Rh is not linked with any increase of the crit. current on compression; in Pt-Tl alloys, all-sided compression under about 1000 atm. lowers T_c , and Au-Ni was found to behave in the same way. The fact that the behavior of the Bi-poor Au-Ni and the Bi-rich Bi-Ni and Bi-Rh are opposed leads to the expectation that under sufficiently high pressures pure Bi will become a superconductor. It is possible that some pure superconductors will also show an increase of T_c and of H_c on compression. A slight effect in that direction was observed, according to a private communication, by V. G. Lazarev on pure Ti. N. Tien

CA

2

Superconductivity of BiMn. N. B. Akhmetovskii (Inst. Phys. Problems, Acad. Sci., U.S.S.R., Moscow). *Zhur. Eksp. Teoret. Fiz.* 19, 571 (1969). By measurements of the magnetic moment, on ellipsoid-shaped samples measured 2 days or less and etched in HCl, the crit. temp. has at 2.23°K. The crit. temp. ded. by measurements of the elec. resistance is somewhat lower, probably on account of surface inhomogeneity of the sample. The change of the crit. magnetic field H_{c1}, H_{c2} is approx. 100 gauss/cm. degree, but, probably in the same reason as above, elec. resistance measurements give $dH_{c1}, dH_{c2} = 250$ gauss/cm. degree.

N. Thou

TRANSLATION AVAILABLE - W. 6707/49, 9 Dec 49

ALEKSEYEVSKIY, N. Ye.
ALEKSEYEVSKIY, N. Ye.

168T105

USSR/Physics - Superconductivity
Bismuth

Sep 50

"Superconductivity of Bi_2K ," N. Ye. Alekseyevskiy,
Inst of Phys Problems, Acad Sci USSR

"Zhur Eksper i Teoret Fiz" Vol XX, No 9, pp 863-864

Considers following dependences: critical field H_k vs
temperature T ; relative resistance $R/R_{h,22^\circ\text{C}}$ vs T ;
magnetic moment, δ , vs field H . Submitted 4 Jun 50.

168T105

ALEKSEYEVSKIY, N. YE.

USSR/Physics - Helium

Nov 50

"Measurement of the Vapor Tension Over Solutions of He^3 in He^4 ," B. N. Yesel'son, E. G. Lazarev, N. Ye. Alekseyevskiy, (Physicotech Inst, Acad Sci Ukrainian SSR; Inst of Phys Problems, of Acad Sci USSR

"Dokl Akad. Nauk SSSR" Vol XX, No 11, pp 1055-1056

Considers Raoult's law for subject solutions up to 2% concentrations of He^3 . Ideal behavior is indicated. Submitted 18 Apr 50.

PA 1697110

S.A.

Sent. A.

Electric Conductivity

[illegible]

AKHIEZER, N. N., BRANIK, N. D., and KOSTIN, T. I.

"Superconductivity of Binary Alloys of Bismuth," *Investitsi Akademii Nauk SSSR, Seriya Fizicheskaya*, 1992, Vol. 10, No. 3, pp. 133-134.

"Ten alloys of non-superconducting Bi with a non-superconducting element (BiLi , BiNa , BiK , BiCa , BiNi , BiMn , BiFe , BiCo , BiZn , BiCd) showed supercond. at 1.73-4.25°K. The supercond. was detd. by measurements of resistance, magnetic moment, current decay in a closed loop, and self-induction with a.c. current. BiLi was prepd. from Bi, purified from Na and K per particle distn. in vacuum; the alloy was made in a high-frequency furnace, washed with H₂O and alc. and kept in He atm. The transition into a superconducting state is at 2.6-2.9°K. BiLi is not superconducting. BiNa and BiK are superconducting. BiCa has a transition point at 3.6°K., the same as BiK ; BiMn and BiFe are not superconducting down to 1.4°K. BiCo , prepd. in an Ar-Fe atmosphere and annealed 120 hrs. at 435° has a crit. temp. of 3.4°K.; BiZn was not superconducting to 1.3°K. BiCd annealed at 435° had a crit. temp. of 1.6°K."

ALLENBERGER, M. M., and BRAUN, H. D.

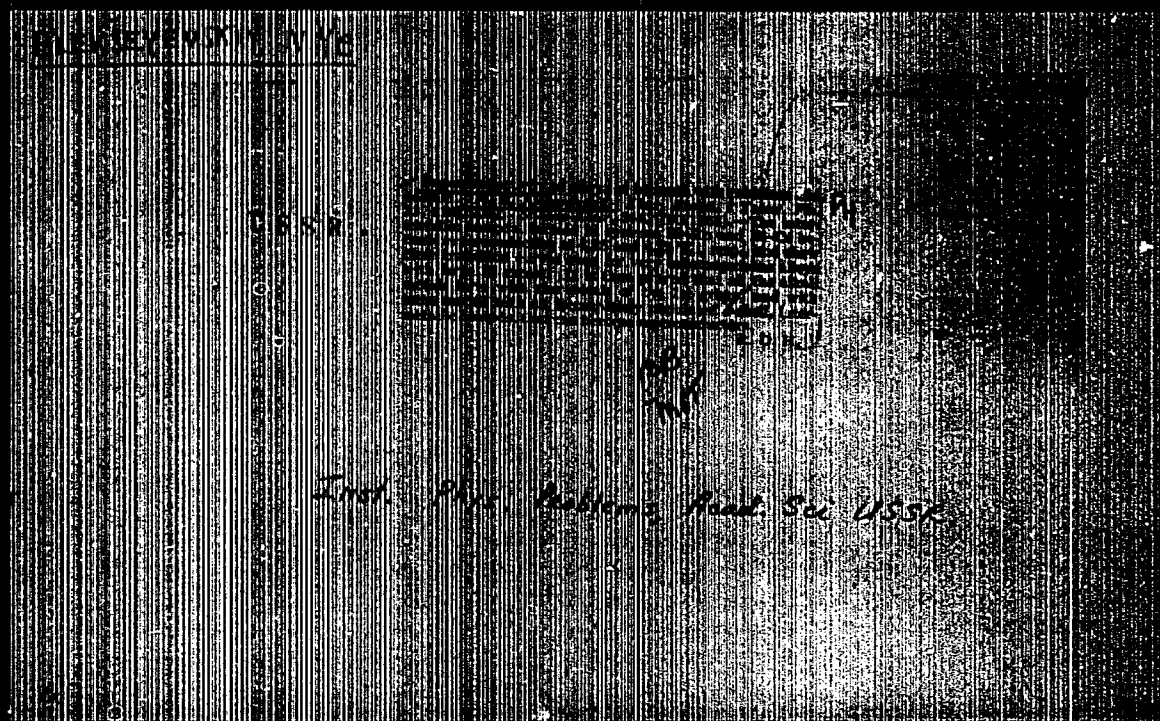
"On the Displacement of Transition Temperature of Superconductors by Pressure," *Journal Experimental'noi i Teoreticheskoi Fiziki*, 1952, Vol. 22, No. 2, pp. 200-203, (Institute of Physical Problems Academy of Sciences USSR). Translation available at Battelle Memorial Institute; also at the Library of Congress Translation Center.

"The pressure dependence of T_c and ΔH_{c1} , ΔH_{c2} and ΔH_{c3} was investigated by the ΔH_{c1} technique the pressure being determined from the known value of dT_c/dp for In. dT_c/dp in $^{\circ}\text{K}/\text{dyn}/\text{cm}^2$ for In was 5.1×10^{-11} , for ΔH_{c1} -3×10^{-11} and for ΔH_{c2} negative (the numerical data quoted, but from graph -6×10^{-11}). Since ΔH_{c1} and ΔH_{c2} are both odd in with nearly identical lattices any possible effect of pressure through change of crystal angles cannot be relevant in causing the opposite signs of dT_c/dp ; it is suggested that the relevant factor may be change of electron concentration with pressure, and that the positive sign occurs only with Bi-rich compounds."

ALMEIDA, M. A.

"Superconductivity of compounds of the system Bi-Pb (Physical Problem Institute Academy of Sciences USSR), Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, 1952, Vol. 23, No. 4, (10), p. 434.

"In alloy samples of the compn. BiPb, transition to the superconducting state was observed at about 3.7°K. In samples richer in Pb the transition temp. was at about 4.0°K. In alloys of the compn. BiPb₂, the Pb used for the preparation of these alloys showed no sign of supercond. between 4.2 and 1.3°K., this variability cannot be attributed to impurities in the Pb. In Bi₂Pb, all-round compression resulted in some lowering of the crit. temp. T_c, but less than in other superconductors having the same sign of $\partial T_c / \partial P$."



ALEKSEYEVSKIY, N. Ye.

USSR/Physics - Superconductivity

FD-497

Card 1/1 : Pub. 146-14/18

Author : Alekseyevskiy, N. Ye.

Title : Isotopic shift of the temperature of transition of thallium into superconducting state

Periodical : Zhur. eksp. i teor. fiz., 24, 240-241, Feb 1953

Abstract : Letter to the editor. Author states that after terminating his investigation on this subject, the same topic was published by the American Bureau of Standards (E. Maxwell and O. S. Lutes, Phys. Rev. 86, 649 (1952)). Results by author satisfactorily agree with those of Maxwell et al. Indebted to I. I. Lifanov, Ye. V. Potapov and V. V. Lipayev. 6 references, including 4 foreign.

Institution : Institute of Physical Problems, Acad. Sci USSR

Submitted : November 12, 1952

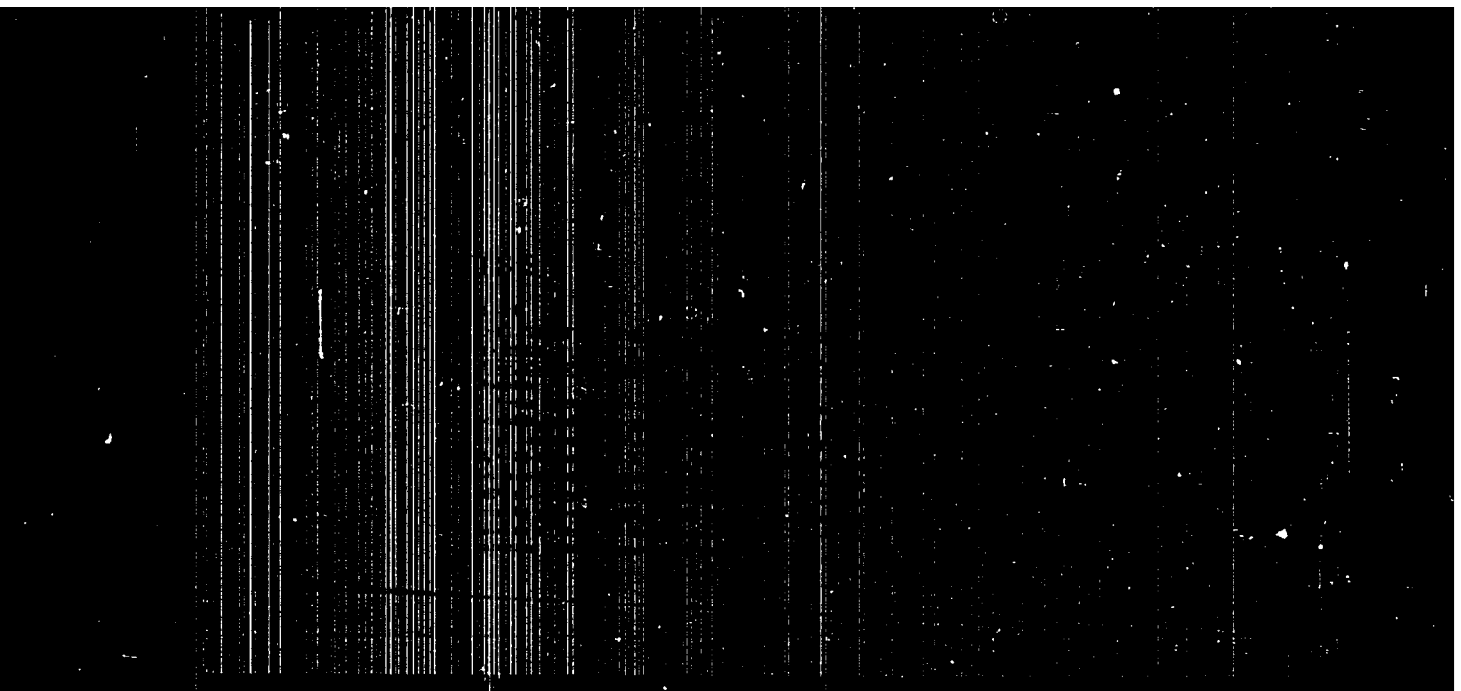
ALEXANDERKIN, E. A., ZHDANKY, G. G., and ZERNANOW, N. P.

"The Structure of Superconductors. II. The Low-temperature Decomposition of the Metallic Compound AuBi ," Journal of Experimental and Theoretical Physics, 1953, Vol. 25, No. 1, (I), 11-123-124. (Moscow Mathematical Institute).

"Microscopic and X-ray powder investigations establish that the superconductor AuBi decomposes at low temperatures; this explains why a small displacement of the temperature of transition to the superconducting state is observed in specimens which have undergone hydrostatic compression."

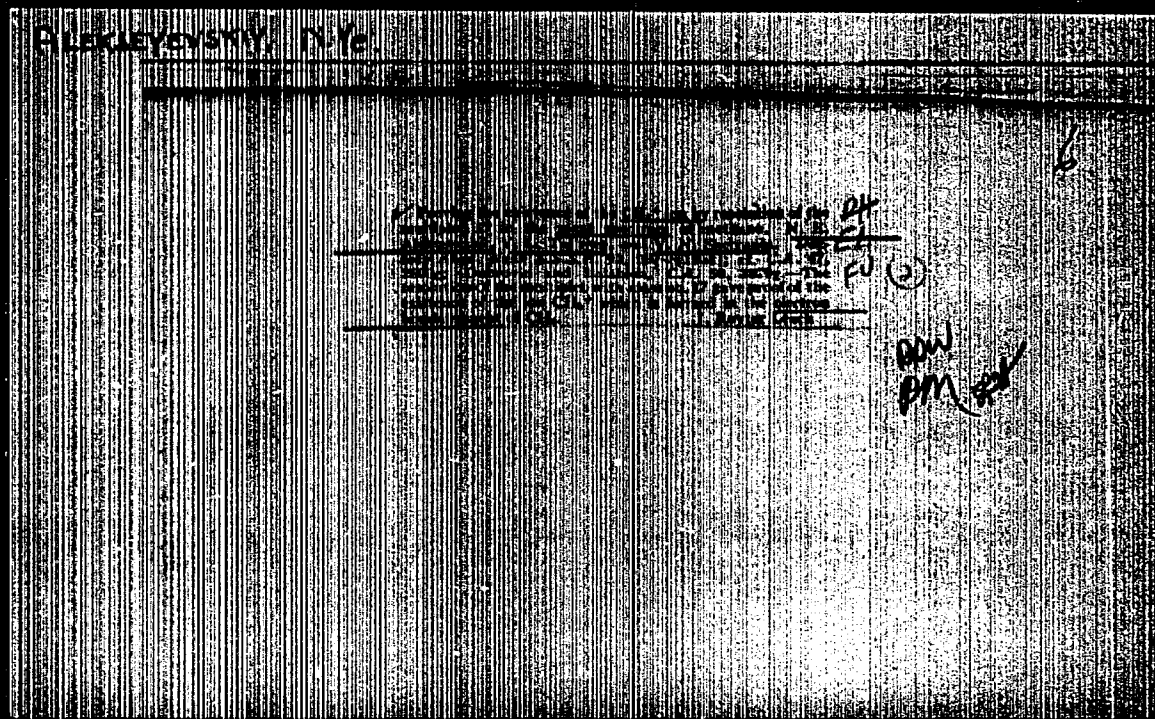
"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000101010013-4



APPROVED FOR RELEASE: 09/24/2001

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ALEKSEYEVSKIY, N. Ye.

Discovery and study of new superconducting alloys

Alekseyevskiy, N. Ye.

Discovery and study of
new superconducting
alloys

Institute of Physical
Problems Lenin S. I.
Neville, Academy of
Sciences USSR

ALEKSEYEVSKIY, N. Ye.
USSR/Physics - Superconductivity

FD-751

Card 1/1 : Pub 146-21/22
Author : Alekseyevskiy, N. Ye., Zhuravlev, N. N., and Lifanov, I. I.
Title : Problem of superconductivity of Bi_2Pd
Periodical : Zhur. eksp. i teor. fiz., 27, 125-126, Jul 1954
Abstract : Letter to the editor. Studies of tetragonal modification of Bi_2Pd at low temperatures revealed superconductivity at 4.28°K . Indebted to Prof. G. S. Zhdanov for experimental work. 5 references.
Institution : Institute of Physical problems; Acad. Sci USSR
Submitted : February 3, 1954

ALEKSEYEVSKIY, M. YE.

USSR/Physics - Superconductors

FD-1828

Card 1/1 Pub 146-13/25

Author : Alekseyevskiy, N. Ye.; Zhdanov, G. S.; Zhuravlev, N. N.

Title : Problem of the superconductivity of the compounds Bi_4Rh and Bi_2Rh

Periodical : Zhur. eksp. i teor. fiz. 28, 237-240, February 1955

Abstract : The authors determine the temperatures of transition in the superconducting state for the crystals of beta and gamma- Bi_4Rh . They explain the unstable behavior of the superconducting alloys of bismuth with rhodium. They thank I. I. Lifanov and N. P. Ivanova for assistance in the experiments. Five references; e.g. Ye. Ya. Rode, Izvestiya In-ta platiny [News of the Institute of Platinum], 7, 1929.

Institution: Institute of Physical Problems; Moscow Engineering Physical Institute

Submitted : February 24, 1954

~~ALEKSEYEVSKIY, N. YE~~
USSR/Physics - Galvanomagnetic effect

FD-1864

Card 1/1 Pub. 146-24/25

Author : Alekseyevskiy, N. Ye., and Brandt, N. B.

Title : Influence of all-sided compression upon the galvanomagnetic effects of bismuth and its alloys. I

Periodical : Zhur. eksp. i teor. fiz. 28, 379-383, March 1955

Abstract : The authors note that an investigation of the influence of all-sided compression upon electron concentration is of interest in connection with earlier considerations on the influence of the density of conduction electrons upon the character of the shift in the critical temperature of superconductors under elastic deformation. With this in mind they measured the Hall effect and variations in electrical resistance in a magnetic field in the case of bismuth and certain compounds of bismuth with other nonsuperconducting metals, and they investigated the temperature dependence of their electrical conductivity under compression and not. They present the results of these investigations. They noted the large number of similar studies by Ye. S. Morozov in 1950-1952. They remark that a considerable part of their work here was conducted at the Cryogenic Laboratory of the Moscow State University of Standards and Measuring Instruments, headed by Prof. P. G. Strelkov and associate A. S. Borovik-Romanov; they also thank T. I. Kostina, N. M. Kreyzes, and V. V. Yevdokimova.

Institution: Institute of Physical Problems, Academy of Sciences

Submitted : June 14, 1954

USSR/Physics - Superconductivity versus pressure

FD-3280

Card 1

Pub. 146 - 39/44

Author : Alekseyevskiy, N. Ye.; Gaydukov, Yu. P.

Title : Influence of pressure upon the superconducting properties of cadmium

Periodical : Zhur. eksp. i teor. fiz., 29, No 5(12), Dec 1955, 898-899

Abstract : The influence of pressure upon the displacement of the critical temperature of superconductors has been investigated by many authors (e.g. N. Ye. Alekseyevskiy *ibid.*, 10, 1940; B. G. Lazarev and L. S. Kan, *ibid.*, 14, 1944; N. Ye. Alekseyevskiy and N. B. Brandt, *ibid.*, 22, 1952; L. S. Kan, B. G. Lazarev and A. I. Sudovtsev, *ibid.*, 18, 1948), but only superconductors whose temperatures of transition lie above 1°K. Among superconductors with lower transitional temperatures is cadmium, which passes over into the superconducting state at 0.54°K. The authors measured the dependence of the critical magnetic field upon temperature in specimens of polycrystalline cadmium without pressure and under pressure, the results of which experiment are given here. For obtaining temperatures in the interval 0.06-0.60°K they used the method of adiabatic demagnetization of a paramagnetic salt; pressure was created by freezing of water in a constant-volume bomb (B. G. Lazarev and L. S. Kan, *ibid.*, 14, 1944). They conclude that the relative change in T_k created by pressure of 1500 atm amounts to 8.3% exceeding by several times corresponding values for other superconductors than Cd. Ten references.

ALEXANDROFF, A. P.

USSR/Physics - Mass - spectrometers

Card 1/2 Pub. 22 - 9/52

Authors : Alexandrov, A. P.; Frutkovskiy, G. P.; Kosurov, G. I. and
 Glukhov, S. I.

Title : Use of a non-uniform magnetic field for the purpose of increasing
 the resolving power of a mass-spectrometer

Periodical : Dokl. AN SSSR 190/2, 229-232, Jan 11, 1955

Abstract : Experiments conducted with mass-spectrometers are described. The
 purpose of the experiments was to find out the affect of a non-
 uniform magnetic field used with the mass spectrometers on the
 resolving power of the latter. The results of the experiments
 show that a non-uniform magnetic field increases the resolving
 power of a mass-spectrometer by a factor of $\frac{1}{1-n}$.

Institution : Acad. of Sci of the USSR, S. I. Vavilov, Institute of Physical
 Problems.

Presented by : Academician A. P. Alexandroff, September 30, 1954

Physiological

Dok. Ak. SSSR 100/2, 229-232, Jan 11, 1954

Card 2/2

Pub. 22 - 9/52

Abstract

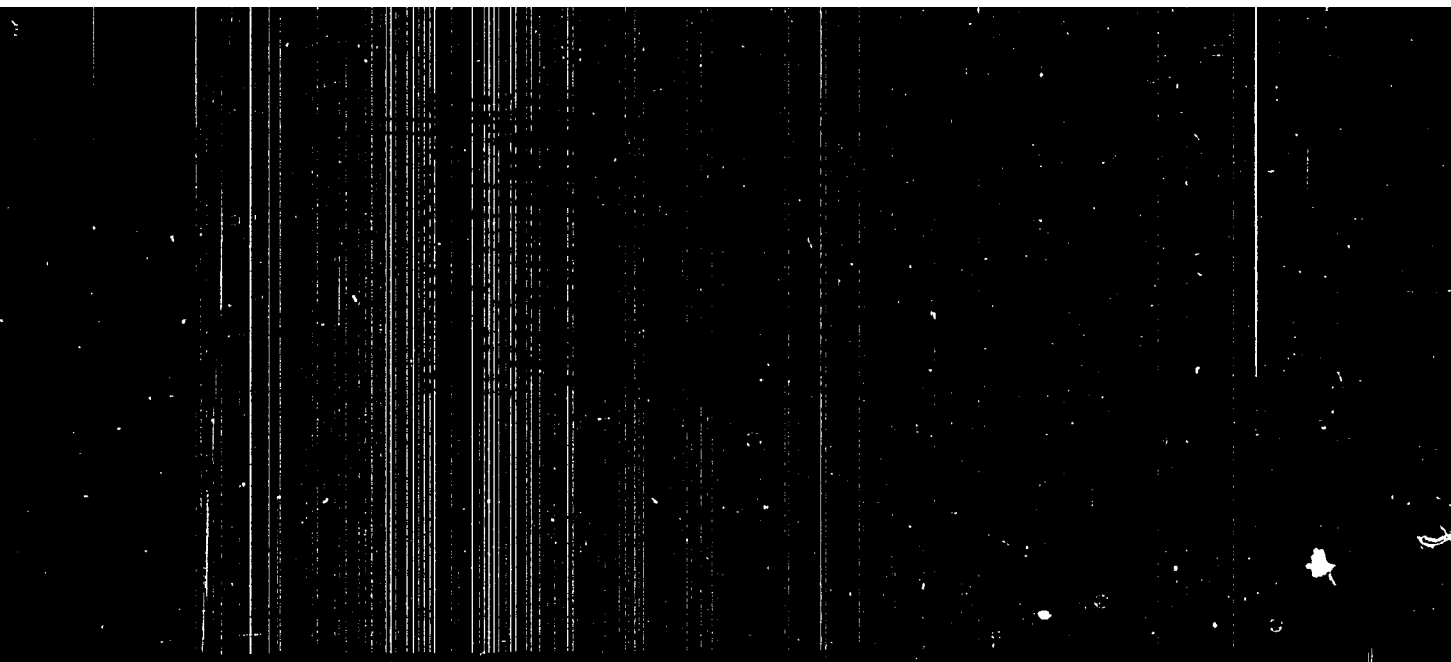
Where η is the coefficient of non-uniformity of the field. It can be calculated by the following formula:

$$\eta = \frac{2N}{\pi r_0} \cdot \frac{1}{\sin \theta} \approx \eta = \frac{2N}{\pi r_0} \approx 2 \frac{N}{L_0} \cdot \frac{\theta}{\pi}, \theta$$

is the angle between generatrices of the magnetic conical tips used for the formation of the non-uniform field. l_0 is the width of the slit on the radius r_0 . Nine references: 1 USSR; 2 German; 6 USA (1941-1952). Diagrams; graphs.

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000101010013-4



APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000101010013-4"

ALEKSEYEVSKIY, N. Ye., BRANDT, N. B., and KOSTINA, T. I., (Moscow)

"Galvanomagnetic Properties of Bismut," a paper submitted at the
International Conference on Physics of Magnetic Phenomena, Sverdlovsk,
23-31 May 56.

"APPROVED FOR RELEASE: 09/24/2001

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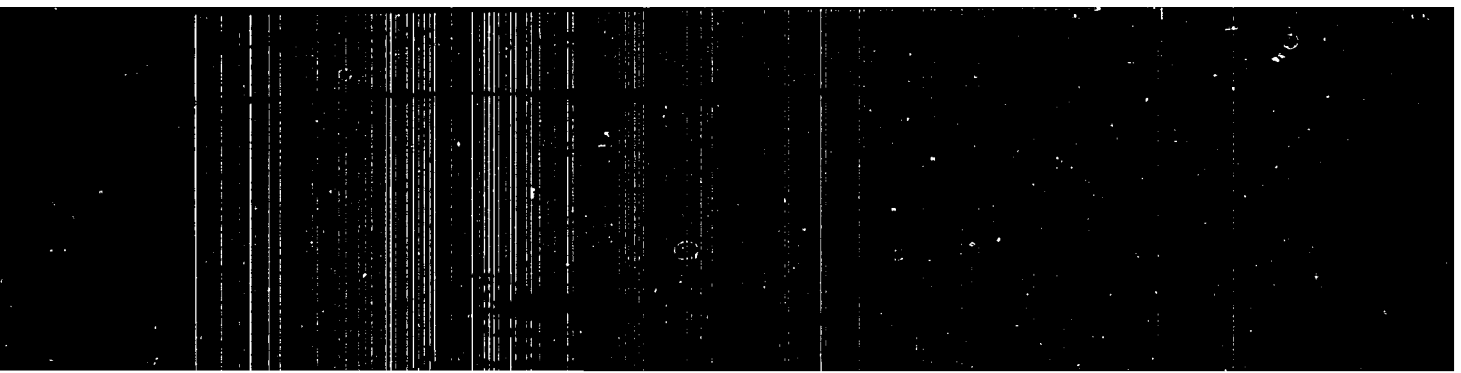
ALBERIKHANTY, V. E., BRUNY, N. D., and KOSTIN, V. I.

"Investigation of the Effect of Pressure on the Superconductive Properties of Gallium at Low Temperatures," Journal of Experimental and Theoretical Physics, 1956, Vol. 31, No. 6 (12), pp. 1643-1647. (Institute of Physical Problems, Academy of Sciences USSR).

"The paramagnetic properties and the influence of uniform compression on them have been investigated in gallium samples of various purity in the temperature intervals 1.4-4.2, 14-20.4 and 6-7° K. at magnetic fields up to 20 kOe. The existence of a minimum in the electrical resistance versus magnetic field strength curve at certain temperatures has been confirmed. It was found that the magnitude of the minimum is a function of the concentration of impurities and increases on uniform compression. The appearance of a minimum in the electrical resistance versus magnetic field strength is ascribed to Zeeman splitting of the impurity levels."

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APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000101010013-4"

~~ALEXSEYEVSKIY, N.Ye.~~ ALEXSEYEVSKIY, N.Ye.
 SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1847
 AUTHOR ALEXSEYEVSKIY, N.E., MICHEEVA, M.N.
 TITLE The Critical Amperages in Supraconductive Tin Films.
 PERIODICAL Zhurn.eksp.i teor.fiz, 31, fasc.6, 951-954 (1956)
 Issued: 1 / 1957

Plane, disk-shaped films were investigated. The current was led in vertical to the disk and collected at its periphery; in this case $H = 2I/r$ holds for the magnetic field on the surface of the disk. Here r denotes the distance from the center of the disk to the place where field strength is to be measured. The tin film was steamed on under a diffusion pump in a high vacuum at the temperature of liquid nitrogen. Special supraconductive leads were used, and the pulse method was employed for measuring; besides, the film was in immediate contact with liquid helium. The current pulses allowed to pass through the sample were produced by a source connected in series. The current- and voltage pulses were registered by a loop-oscillograph. The experimental system was fed by a 220 V-laboratory battery. By the variation of the parameters of the system it was possible to obtain pulses of different duration (usually 0,1 sec) and amplitude. It may be seen from an attached oscillogram that the voltage pulse occurs at a certain intensity of the current passing through the sample. This is the critical amperage for the given experimental conditions. The linear dependence $I_k(r)$ obtained is indicative of a nearly radial distribution of amperage and of a weak influence exercised by the heating (during the current pulse) of that

Žurn.eksp.i teor.fiz, 31, fasc.6, 951-954 (1956) CARD 2 / 2 PA - 1847

part of the film which is located between the current lead-ins. The critical amperages of the films were measured within the temperature range $\Delta T, 0,5^{\circ} K$, and the films investigated had a thickness of from $6,9 \cdot 10^{-6}$ to $6,4 \cdot 10^{-5}$ cm. The dependence $H_{KI}(\Delta T)$ found here (where H_{KI} denotes the magnetic field strength produced by the critical current) can be represented in the form $H_{KI} \sim \Delta T^n$. According to approximated estimates $n \sim 0,6$ applies here. H_{KI} depends approximately linearly on the thickness of the film. These results which were obtained by the impulse method were, in addition, verified by another method: From a punctiform source a ring-shaped film having a width of $2a = 1,5$ mm was sprayed onto a polished glass plate with no lead-ins. An undamped current was induced in this film by means of a magnetic field at the lowest possible helium temperature. For the purpose of determining the critical amperage the magnetic field of the current passing through such a plane ring was measured. This method made it possible to measure the critical amperage of films of $2 \cdot 10^{-5}$ cm thickness at temperatures of from $1,6$ to $3,7^{\circ} K$. The results obtained by means of this method are in approximate agreement with those obtained by the methods described above.

INSTITUTION: Institute for Physical Problems of the Academy of Science in the USSR.

АЛЕКСЕЕВ И САНД, А. В.

137-58-1-1558

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1. p 209 (USSR)

AUTHORS: Alekseyevskiy, N. Ye., Brandt, N. V.

TITLE: An Investigation of the Properties of the Compounds Au_2Bi and Bi_2K (Issledovaniye gal'vanomagnitnykh svoystv soyedineniy Au_2Bi i Bi_2K)

PERIODICAL: Vestn. Mosk. un-ta. Ser. matem., mekhan., astron., fiz., khimii, 1957, Nr 1, pp 39-43

ABSTRACT: An investigation has been made of the compounds Au_2Bi and Bi_2K , which exhibit similar crystal structures and periods, and have superconductivity and magnetic transformation temperatures of 1.75 and 3.58°K. Measurement of the magneto-resistance properties was made at 1.7°K and with magnetic fields of 30,000 Oe by the usual potentiometric method. The temperature was determined by the vapor pressure of liquid He in a Dewar flask. The starting materials were: Hilger Bi, 99.9996% pure; Kahlbaum K; Au 99.99% pure. The specimens of Au_2Bi were made in the form of thin platelets enclosed in quartz ampoules. After the ampoules were etched, the specimens were annealed for 5-7 days at 320°C. The specimens of Bi_2K were prepared

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137-58-1-1558

An Investigation of the Properties (cont.)

in special small baths, from which they were extracted in an inert gas atmosphere and then were covered with a layer of vacuum grease for preservation against oxidation. The quality of the specimens was monitored metallographically. It is shown that the nature of the relationship of the relative rise in electrical resistance to the magnetic field is virtually proportional to the square of the latter for both compounds. The anomalous curve of the change in the resistance of Bi_2K versus the intensity of the magnetic field causes advancement of the hypothesis that the de Haas-van Alphen effect may be observed in Bi_2K . An equation for evaluating the strengths of the current carriers has also been derived. The concentration of electrons in Au_2Bi and Bi_2K lies in the area between the concentrations of their components. This is in good agreement with the hypothesis on the relationship between the superconductivity and the optimal value of electron concentration.

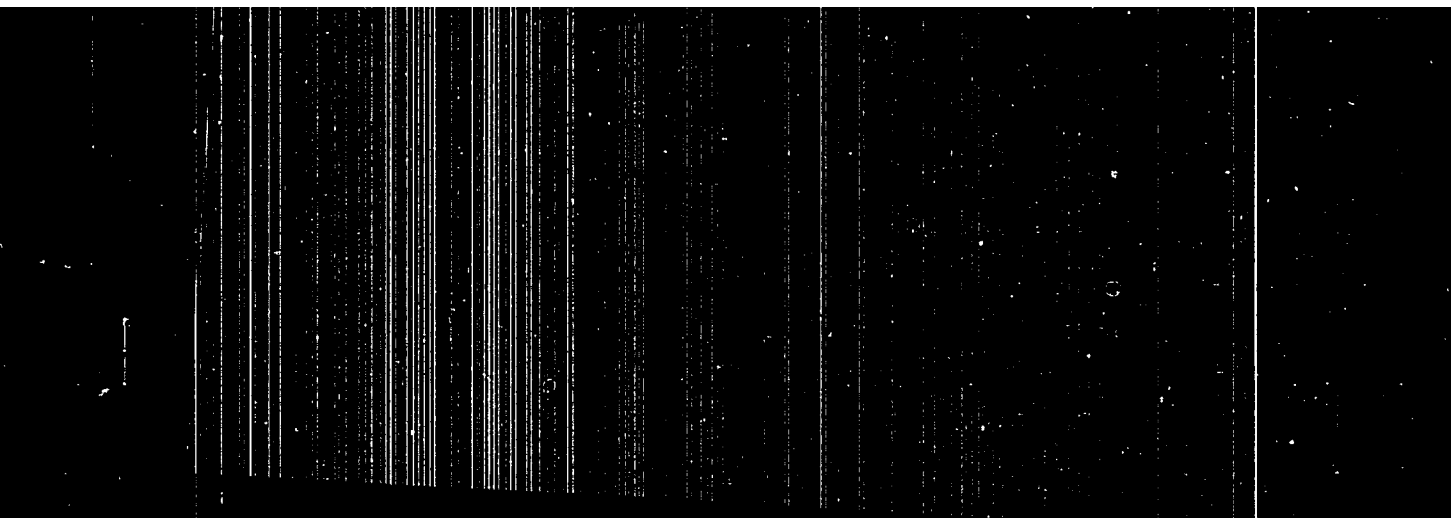
V. R.

1. Gold compounds--Properties

Card 2/2

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APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000101010013-4"

ALEKSEYEVSKIY, N.Ye.; BRANDT, N.B.

On galvanomagnetic properties of the compounds Au_2Bi and Bi_2K .

Vest.Mosk.un. 12 no.1:39-43 '57.

(MLBA 10:8)

1.Moskovskiy universitet, Kafedra fiziki nizkikh temperatur.
(Bismuth alloys--Magnetic properties)
(Superconductivity)

ALEXANDER N. YE.

SUBJECT: USSR/Physics of Magnetic Phenomena 48-6-2/23

AUTHOR: Alekseyevskiy, N.Ye., Brandt, N.B. and Kostina, T.I.

TITLE: Effect of Pressure on Galvanomagnetic Properties of Bismuth
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957,
Vol. 21, # 6, pp 790-795 (USSR)

ABSTRACT: The effect of an all-sided compression on the temperature-dependence of electric resistance and galvanomagnetic properties of bismuth was investigated.

Galvanomagnetic phenomena were studied on monocrystalline bismuth samples of various purity. Main admixtures in bismuth samples were Pb, Sn, Te and Se whose concentration varied from 0.03 to 0.0005 %, and by raising room temperature to that of helium, changed their electric resistance, and their resistance in a field of 19,000 oersteds at $T = 4,2^{\circ} K$ changed by more than 10^6 times.

The following conclusions were drawn from the experiments performed:

Card 1/3

48-6-2/23

TITLE: Effect of Pressure on Galvanomagnetic Properties of Bismuth
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

The all-sided compression has a strong effect on the galvanomagnetic properties of bismuth. Small Te-admixtures (more than 0.005 %) wholly eliminate the pressure effect, whereas this effect is retained by Bi with Pb- and Sn-admixtures in considerably higher concentrations (0.02 %)

The Hall-coefficient and E_y/E_x ratio reverse the sign with the field in bismuth with Pb- and Sn-admixtures. The ratio E_y/E_x in the highly-intensive fields varies linearly with the field, and the value and sign of the angular coefficient depend on the nature and quantity of an admixture.

The temperature-dependence curve of the resistance of Bi containing Pb and Sn from 0.01 to 0.02 % has a peak at an all-sided compression, which disappears when the pressure is removed.

Sufficiently pure Bi-samples show oscillations of the dependences of r and E_y/E_x on H , which are maintained during the all-sided compression.

Card 2/3

48-6-2/23

TITLE: Effect of Pressure on Galvanomagnetic Properties of Bismuth
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

The article contains 8 graphs.

There are 12 references, 7 of which are Slavic (Russian).

ASSOCIATION: Institute of Physical Problems im. S. Vavilov

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress

Card 3/3

ALLENSENE USE ONLY

AUTHOR: ALEKSEYEVSKIY, N.Ye., GAYDUKOV, Yu.P. 56-6 54/56
TITLE: The Hall Effect and the Susceptibility of Gold. (Effekt Halla i vospriimchivost' zolota, Russian)
PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 6, pp 1589 - 1591 (U.S.S.R.)
ABSTRACT: The following experimental results were obtained: The dependence $r(T)$ for the gold sample Au-1 shows $T_{\min} \approx 4^{\circ}\text{K}$. The increase of r takes place proportional to $\ln(1/T)$, where $\Delta r/r_{\min}$ at $T = 0,07^{\circ}\text{K}$ amounted to about 15 %. The measurement $\Delta r = r_{0,07^{\circ}\text{K}} - r_{\min}$ in dependence on the magnetic field furnished the value $\approx 8,5 \text{ kOe}$ for H_k .
 The gold sample Au-4 shows no irregularities. In the temperature range of from 295°K to $1,45^{\circ}\text{K}$ the magnetic susceptibility of gold of the class Au-1 remains diamagnetic, where its value at $1,45^{\circ}\text{K}$ amounts to 70% of the value at 295°K .
ASSOCIATION: Institute for Physical Problems of the Academy of Science of the U.S.S.R.
PRESENTED BY:
SUBMITTED: 28.3.1957
AVAILABLE: Library of Congress
 Card 1/1

ALEKSEYEVSKIY, N. Ye.

AUTHOR: ALEKSEYEVSKIY, N. Ye., POTAPOV, Ye. V. 56-7-51/66
 TITLE: A Calorimetric Method of Determining the Optical Metal Constants
 in the Infrared Part of the Spectrum at Low Temperatures.
 (Kalorimetricheskii metod opredeleniya opticheskikh konstant
 metallov v infrakrasnoy oblasti spektra pri nizkikh tempera-
 turakh, Russian)
 PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 33, Nr 7, pp 283-284
 (U.S.S.R.)
 ABSTRACT: The construction of a device is described by means of a graph, by
 means of which it is possible to determine the two optical metal
 constants simultaneously. For bismuth the constants are deter-
 mined in the wave range of $1 - 7\mu$ and an angle of incidence of
 70° ; $n = 2$ and $x = 2.5$, wherefrom it follows that $| \epsilon | = 2.2$,
 which, in turn, corresponds to $N \approx 3.10^{20}$. (With 1 Illustration
 and 2 Slavic References).
 ASSOCIATION: Institute for Physical Problems of the Academy of Sciences of the
 U.S.S.R. (Institut fizicheskikh problem Akademii nauk SSSR)
 PRESENTED BY:
 SUBMITTED: 3-4.1957
 AVAILABLE: Library of Congress
 Card 1/1

ALEXSEYEVSKIY, N. Ye

FRANK J. BOON EXPLOITATION

ПРАКТИКА И ТЕОРИЯ
 1977

Priluchnyiye Letopis. Moscow, Gosstatizdat, Radiotekhnika i Svyaz' (Radio Engineering, Communications, and Electronics) Press, 1970. 120 pages. 150,000 copies printed.

Spencer's Agency: 2200 1st St. N. Minneapolis, MN 55412
1991-1992: 2200 1st St. N. Minneapolis, MN 55412

Editorial Board: Projev, N.S. (resp. Ed.), Shvernov, N.R.
(Deputy Resp. Ed.), Agintsev, K.K., Altshteyn, S.A., Bockharov,
V.V., Loshchinsky, N.I., Miller, T.P., Shaltyn, Y.I., and
Popov, S.S. (Secretary); Tech. Ed.: Morozov, N.D.

NOTE: This collection is published for scientists, technologists, persons engaged in medicine or medical research, and others concerned with the production and/or use of radioactive and stable isotopes and radiation.

CONTENTS: Thirty-eight reports are included in this collection under three main subject divisions: 1) production of isotopes 2) high-energy gamma-radiation facilities, and 3) radiometry and dosimetry.

! ATTENTION TO EVERY

REPORT OF WORK

Trulov, Yu.S.; V.V. Bekharov, and Ye.Ye; Sushch. Development of
factory production in the Soviet Union.
This report is a summary, annotated

This report is a general survey of production methods, apparatus, raw materials, applications, investigations and future prospects for radio isotopes in the Soviet Union.

Sam 2/12

Khokhlovskiy, B.Ye.; A.Y. Dubrovin, G.I. Kasurov, A. P. Krut'evskiy, S.I. Pilymonov, V.I. Chikis, V.S. Shalyapin (deceased), and G.I. Shuralova. Utilization of Mass Spectrometers With a Heterogeneous Field for Analyzing Isotopes of Light Elements.

2

Ordnberg, E.O., and O.M. Zubarev. Relative Propability of Palladium and Germanium Isotopes

94

**Reisen, A.-H. Some Problems on the Theory of Isotope
Concentration**

35

Overstulski, I.O. and V.K. Tikhomirov. Separation of

28

Barrish, G.J., and A.Ya. Kuznetsov. A Diffusion Column for Separating Isovotopes

22

Case 5:20-cv-01003-UNA Document 1-1 Filed 07/27/20 Page 1 of 1

24(3)

AUTHORS:

Aleksyevskiy, N.Ye., Brandt, N.B.
and Kostin, I.I.

SOV/55-58-5-12/34

TITLE:

Investigation of the "Quadratic" Hall-Effect for Bismuth, Tin and Aluminum for low Temperatures (Issledovaniye "kvadratichnogo" effekta Kholla u vismuta, olova i al'yuminiya pri niskikh temperaturakh)

PERIODICAL:

Vestnik Moskovskogo universiteta, Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 5, pp 73 - 78 (USSR)

ABSTRACT:

The quadratic Hall-effect for Ge measured by Goldberg [Ref 1] was measured by the authors for Al, Sn and Bi in the temperature interval from 293° to 4.2° K in different magnetic fields. In order to determine the influence of this effect on galvanomagnetic metal properties for strong effective magnetic fields

$$\left(H \frac{R_{0,293^{\circ}K}}{R_{0,T}} \right)$$

simultaneously the electronic resistance of the same test pieces was measured in the transverse and longitudinal field. The test-pieces had been produced according to the method of

Card 1/2

11

Investigation of the "Quadratic" Hall-Effect for
Bismuth, Tin and Aluminum for low Temperatures

SOV/55-58-5-12/34

P.L. Kapitza. The effect was observed on for all test pieces and increased with decreasing temperature and cleanliness of the test piece. The impurities of Te have particularly strong influence on the galvanomagnetic properties of Bi, Sn and Sb have a weaker effect. Several further statements are given. There are 6 figures, 1 table, and 9 references, 5 of which are Soviet, 3 American, and 1 English.

ASSOCIATION: Kafedra fiziki niskikh temperatur (Chair of Physics of Low Temperatures)

SUBMITTED: April 5, 1958

Card 2/2

AUTHOR: Alekseyevskiy, N. Ye., Doctor of Physical and Mathematical Sciences SOV/30-58-6-9/45

TITLE: Mass Spectrometer With High Resolving Power (Mass-spektrometr vysokoy razreshayushchey sily)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 6, pp. 67 - 69 (USSR)

ABSTRACT: Apparatus working with a homogeneous magnetic field are constructed both in the USSR and in foreign countries. They make it possible, e.g., to separate the mercury-isotopes with the masses 196, 198, 199, 202 and 204 from each other and to determine their relative content in the investigated sample. The deuterium-content in hydrogen, on the other hand, cannot be determined by means of such an apparatus, which is not possible in many other cases either. If, instead of a homogeneous field, a magnetic field which decreases from the center to the periphery, is applied for the deflection of the ionic beam, then the heavy ions - by moving on the greater radii - enter the region of the weaker magnetic field and are therefore deflected to a smaller extent. The focusing of the diverging ionic beam in a heterogeneous magnetic field takes only place in that case in which

Card 1/2

Mass Spectrometer With High Resolving Power

SOV30-53-6-9/45

the beam is deflected through an angle of more than 180° . The author of this article - in collaboration with G.P. Prudkovskiy, O.I. Kossourov and S.I. Filimonov showed this in his work (Ref 1 and Fig 1). By this it is made possible to dissolve the major part of the mass-spectral-lines and to carry out their analysis. The scheme of a ion-source with a transverse electron-beam is shown in figure 2, which is necessary for the realization of the possibilities of the apparatus with a heterogeneous magnetic field. Various laboratory variants of this apparatus were manufactured in the Institute for Physical Problems of the AS USSR. Two specimens of an industrial variant of the apparatus with heterogeneous magnetic field were developed and built by the State Union Design Office for the Construction of Analytical Apparatus in 1957. One of them was exposed on the World-Exhibition in Bruxelles (Fig 3). A spectrograph from this apparatus is given in figure 4. There are 4 figures and 1 reference.

1. Mass spectrum analyzers--Design
2. Magnetic fields--Applications
3. Ion beams--Focusing
4. Mercury isotopes--Separation

Card 2/2

SOV/56-34-5-51/61

AUTHORS: Alekseyevskiy, N. Ye., Brandt, N. B., Kostina, T. I.

TITLE: On the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures (Ob anomal'nykh gal'vanomagnitnykh svoystvakh metallov pri nizkikh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki. 1958, Vol. 34, Nr 5, pp. 1339-1341 (USSR)

ABSTRACT: Investigating the galvanomagnetic properties of bismuth in transverse and longitudinal magnetic fields, the authors observed an anomalous change in the potential difference similar to that observed by other authors. According to the results obtained by these authors the difference of the potentials V_x measured on the potential electrodes after the usual increase in weak magnetic fields passed through a minimum, and then decreased to zero. In some cases also the sign changed. The authors made additional experiments in order to investigate the influence of the form and of the manner of connecting the electrodes on the character of the variations of V_x in a magnetic field. It is possible to explain the anomalies which were observed previously by other authors

Card 1/1

SOV/56-34-5-51/61

On the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures

by the influence of quadratic effects, in particular by a "quadratic Hall effect". This effect consists in the following: in the specimens placed in a magnetic field there is a transverse difference of the potentials V_y in the plane which is determined by the directions of the current and of the magnetic field. The difference of the potentials V_y is a quadratic function of the magnetic field strength and in isotropic specimens it has its maximum values if the angle between current and field is equal to 45° . If the variation of the resistance in the magnetic field is small (for instance for measurements in a longitudinal field) only a very small component V_y (directed parallel to the specimen) is sufficient to distort in a qualitative manner the curve of the real variation of the resistance in the magnetic field. An especially strong distortion of the discussed results is observed, if the area of the current contacts is small with respect to the cross-section of the specimen and if the potential electrodes are placed close to the ends of the specimen. Increasing the relation (length of the specimens/diameter of the specimens) did not diminish the anomalous effects; when the position of the potential electrodes was not

Card 2/3

SOV/56-34-5-51/61

on the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures

changed. It is advantageous to execute the measurement on specimens with electrodes which have the same cross-section as have the specimens. There are 1 figure and 9 references, 5 of which are Soviet.

ASSOCIATION

Institut fizicheskikh problem Akademii nauk USSR
(Institute for Problems on Physics, S. USSR) Moskovskiy gosudarstvennyy universitet (Moscow State University)

DATE

February 5, 1959

1. Metals--Magnetic properties 2. Metals--Temperature factors

24 415

24(2)

SOV/55-35-2 58/60

AUTHORS:

Alekseyevskiy, H. Ya.. Gaydukov Yu. P.

TITLE:

The Anisotropy of the Electric Resistance of a Gold Mono-crystal in a Magnetic Field at 4.2°K (Anizotropiya elektricheskogo soprotivleniya monokristalla zolota v magnetnom pole pri 4.2°K)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki. 1958 Vol 35. Nr 2(8). pp 554-555 (USSR)

ABSTRACT:

The results of many papers concerning the investigation of the galvanomagnetic properties of monovalent metals do not agree with the theory. It is interesting therefore to investigate the character of the variation of the resistance of these metals in a magnetic field. These investigations are carried out for various crystallographic directions. A gold mono-crystal is the most useful material for this purpose. Such a monocrystal (height 30 mm and 0.5 mm purity 99.9999 %) was prepared. The resistance was varied by 1650 times when the temperature decreased from the laboratory temperature to 4.2°K. A polar diagram was obtained for this gold monocrystal in a magnetic field of $H = 23 \text{ kOe}$ at $T = 4.2^\circ\text{K}$. The rotation

Card 1/1

SOV/55 35 2 58/60

The Anisotropy of the Electric Resistance of a Gold Monocrystal in a Magnetic Field at 4.2°K

axis of the magnetic field was parallel to the axis of the gold monocrystal. The dependence of the ratio $\Delta r_H/r_0 = (r_H - r_0)/r_0$ on magnetic field strength was obtained in the direction of the highest maximum and of the lowest minimum of the polar diagram. r_H and r_0 denote the values of the resistance in the magnetic field and without a magnetic field. The results of these measurements are shown in 2 figures. In the direction of the maximum an unlimited increase of the resistance ($\Delta r_H/r_0 \sim H^2$) is observed, but in the direction of the minimum the resistance is totally saturated ($\Delta r_H/r_0 \sim 1$), if $H \gg H_0$. H_0 may be derived from the equation $1/R = 1$ and in the investigated case it is equal to 1.4 kOe. l denotes the free length of path and R the curvature of the trajectory of the motion of the conduction electrons in the magnetic field. Analogous results were found for all the maxima and minima of the polar diagram. From the results of this paper the following conclusions may be drawn: The linear increase of the resistance of polycrystalline

Card 2/3

SOV/56 35-2 58/60

The Anisotropy of the Electric Resistance of a Gold Monocrystal in a Magnetic Field at 4.2°K

specimens (which was found by Kapitza) is caused by the averaging of various ratios $\Delta r_H/r_0$ with respect to the angles. The author thanks P. L. Kapitza, Member, Academy of Sciences, USSR, for the discussion of these results. There are 2 figures and 7 references 3 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR
(Institute of Physical Problems, AS USSR)

SUBMITTED: June 14, 1955

Card 5/5

18(6)

AUTHORS:

~~Alaksayevskiy, N. Ye.,~~
Gaydukov, Yu. P.

SOV/56-35-3-47/61

TITLE:

The Influence Exercised by a Plastic Deformation Upon the Anomalous Behavior of the Resistance of Gold at Low Temperatures (Vliyaniye plasticheskoy deformatsii na anomal'noye povedeniye soprotivleniya zolota pri nizkikh temperaturakh)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 3, pp 804 - 806 (USSR)

ABSTRACT:

First, two earlier papers dealing with this subject are referred to in short. For the purpose of investigating the influence exercised upon the minimum resistance of gold more accurately, the authors carried out an experimental investigation of the influence exercised by elastic and plastic deformations on the depth of the minimum and on the value of the "critical" field strength H_0 . Compression occurred from all sides by allowing water to freeze in a bomb made of beryllium bronze. In the case of such a compression from all sides the depth of the minimum is reduced only a little and also the specific resistance changes only very slightly. The influence exercised by

Card 1/3

The Influence Exercised by a Plastic Deformation
Upon the Anomalous Behavior of the Resistance of
Gold at Low Temperatures

SOV/56-35-3-47/61

plastic deformation on the course of the resistance curves was investigated in two series of tests. In the course of the first series of tests, the deformation of the sample was investigated at the temperature of liquid helium by means of a special press. The deformations obtained at the temperature of liquid helium were comparatively small. The influence exercised by greater deformations was investigated on wires which were deformed at room temperature by means of a hydraulic press. The result obtained by these measurements are shown by diagrams. According to all results obtained in the present case, the depth of the minimum and the "critical" field strength depend to a considerable extent on the deformation. With a certain value of deformation, the depth of the minimum becomes equal to zero, and the critical field-strength tends towards infinity. A comparison of all results obtained results in the following: The occurrence of the minimum of resistance is caused by the scattering of conductive electrons on the impurities of certain elements. The authors thank P. L. Kapitza for discussing the results obtained. There

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The Influence Exercised by a Plastic Deformation
Upon the Anomalous Behavior of the Resistance of
Gold at Low Temperatures

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are 3 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute
for Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: June 14, 1958

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24.7700
~~24 (3)~~, ~~18 (6)~~
 68047
 SOV/55-59-3-15/32
 AUTHORS: Alekseyevskiy, N. Ye., Zhdanov, G. S., Zhuravlev, N. N.
 TITLE: The Problem of the Superconductivity¹ of Compounds of Bismuth¹ With Alkali Metals
 PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Nr 3, pp 113 - 115 (USSR)
 ABSTRACT: By analysis of the critical temperature of bismuth-alkali compounds a linear dependence between the critical temperature T_c of the compound and the atomic radius of the alkali metal was found. This linear dependence does not hold for the LiBi compound; it possibly holds for the compounds with alkaline earth metals. A comparison between T_c and the atomic radius is quite permitted for the isomorphous compounds KBi_2 , RbBi_2 , CsBi_2 , but less for NaBi , which has a different type of lattice. With an increase in the critical temperature T_c the minimum inter-atomic spacings in the transition from KBi_2 to CsBi_2 increase, the dependence between the minimum distance and T_c being linear. By means of a relationship between dH_c/dT and γ (the coefficients

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The Problem of the Superconductivity of Compounds of Bismuth With Alkali Metals SOV/55-59-3-15/32

of the linear term of n-type specific heat), the value of γ for the three isomorphous compounds may be determined from the known value of dH_k/dT . Table 2 contains the values of dH_k/dT and the values of γ calculated from them, which increase from LiBi to CsBi_2 . In the superconductive bismuth-alkali compounds there is obviously no linear dependence between T_c and γ/v , where v denotes the atomic volume. However, when the dependence $T_c = f(\gamma^{1/3})$ is constructed, the points lie near a straight line passing through the origin of coordinates. There are 1 figure, 2 tables, and 7 references, 5 of which are Soviet.

ASSOCIATION: Kafedra fiziki tverdogo tela (Chair for Solid-state Physics) ✓

SUBMITTED: February 27, 1959

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5-41, 24-3

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SOV/55-59-3-16/32

AUTHORS:

Zhuravlev, M. N., Zhdanov, G. S., Alekseyevskiy, N. Ye.

TITLE:

The Crystal Chemistry of Superconductive Bismuth Compounds

PERIODICAL:

Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Nr 3, pp 117 - 127 (USSR)

ABSTRACT:

The present paper deals with some results obtained by an analysis of the crystallo-chemical data found by the authors concerning the structure of superconductive bismuth compounds. A comparison between the superconductive properties with crystallo-chemical data was carried out on the basis of known results determined in most cases by N. Ye. Alekseyevskiy (Refs 20 - 35) at the Institut fizicheskikh problem AN SSSR (Institute for Physical Problems of the AS USSR). The first part of the present paper deals with 1) the capability of bismuth to form compounds with various elements of the periodic system and 2) with the electric properties of these compounds. Among other things the existence of the compounds K_9Bi_7 , K_3Bi_2 , Rb_3Bi_2 , Rb_2Bi , and Cs_2Bi is supposed. It may be that the compounds $CeBi_2IrBi$ and $\beta-LiBi$ are superconductive. With the

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elements to the right of the group of superconductive elements of the B-subgroup, bismuth forms no superconductive compounds. The physico-chemical and X-ray structural investigations of the alloys of bismuth with non-superconductive alkali-, alkaline earth-, and transition metals show the manifold superconductive compounds with respect to composition, syngonies, and structural types. These structural types may also be of a complex nature. The polymorphic transformations of superconductive compounds change their superconductive properties in a manner that is similar to that in the case of allotropic transformations. Two isomorphous groups of superconductive bismuth compounds may be distinguished: one with alkali metals (potassium, rubidium, and cesium) with the composition AB_2 , and a second with the transition metals (nickel, rhodium, and platinum) with the composition AB . In these isomorphous bismuth compounds the critical temperature T_c depends linearly on the atomic radius of the substituted component. A variation of the bismuth-bismuth minimum interatomic spacings varies the critical temperature T_c of the isomorphous compounds. In the bismuth-alkali compounds an increase of the minimum interatomic spacings leads to an increase

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of T_0 . Bismuth compounds with transition metals show the reverse effect. The minimum interatomic spacings bismuth-bismuth vary within a wide range in the case of the various bismuth compounds. Bismuth compounds with small and also with large bismuth-bismuth spacings are not superconductive, but all compounds in which bismuth-bismuth spacings are within the "optimum" interval (3.1 to 3.8 Å) are superconductive. The superconductive modification of bismuth probably has a face-centered elementary cell. A large table shows the atomic-crystalline structural properties of bismuth compounds with non-superconductive elements. The experiments made by N. B. Braidd (Ref 56) are indicative of a decrease of the anisotropy of the crystal structure of ordinary bismuth in the case of compression. There are 3 figures, 4 tables, and 56 references, 40 of which are Soviet.

ASSOCIATION: Kafedra fiziki i verdogo tela (Chair for Solid-state Physics)

SUBMITTED: February 27, 1959

Card 3/3

24(5)

AUTHORS:

Alekseyevskiy, N. Ye., Gaydukov, Yu. P. SOV/56-36-2-15/63

TITLE:

Measurement of the Electric Conductivity of Metals in a Magnetic Field as a Method of Investigating the Fermi Surface
(Izmereniye elektroprovodnosti metallov v magnitnom pole kak metod issledovaniya poverkhnosti Fermi)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
Vol 36, Nr 2, pp 447-450 (USSR)

ABSTRACT:

Lifshits, Arbel', Kaganov (Ref 1) as well as Chambers (Chambers) (Ref 2) showed that isoenergetic surfaces of conductivity electrons in metals can be represented by topologically composed surfaces with open cross sections. The Fermi surface can be built up from data obtained by measurement of the de Haas-van Alphen (de Gaaz, van Al'fen) effect, of the anomalous skin effect, or of cyclotron resonance (Ref 3). However, these measurements did not produce unique results near open cross sections. The present paper intends to investigate the anisotropy of electric resistance in a magnetic field in various (Sn, Pb, Tl, Ga, Na) single crystals in connection with the existence of open Fermi surfaces. As already shown (Ref 1), a quadratic increase of resistance is to be expected in open Fermi

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Measurement of the Electric Conductivity of Metals SOV/56-36-2-15/63
in a Magnetic Field as a Method of Investigating the Fermi Surface

surfaces for one field direction, whereas for another field direction saturation sets in. In a previous paper (Ref 4) the authors already investigated the variation of resistance in gold and copper in dependence on the angle formed by the magnetic field \vec{H} and the crystallographic axes, and they showed that for the course $\Delta r_H/r_0$ partly a quadratic increase and partly saturation occurs, according to the direction of \vec{H} . Now, the angular dependences of $r(H)$ for other metallic single crystals are investigated at 2.4 and 1.5°K. The data characterizing the samples are given in a table. The polar diagrams measured for $H = \text{const}$ on a Sn-, Pb-, and Tl-sample are shown by figure 1 ($H = 23 \text{ kOe}$, 22.3 kOe and $T = 4.2^\circ\text{K}$). \vec{H} was in all cases vertical to the measured current \vec{J} . These diagrams show that also in these crystals it is true that with a variation of the angle between the field and the crystallographic axes the law of increase of the resistance in the magnetic field changes from a quadratic form to that of saturation (Fig 2). Anisotropy was found to be especially high in tellurium and gallium.

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in a Magnetic Field as a Method of Investigating the Fermi Surface

A theoretical explanation of these phenomena is given by the paper by Lifshits and Peshanskiy (Ref 6).
The authors finally thank Academician P. L. Kapitsa for his constant interest in this work. There are 2 figures, 1 table, and 9 references, 5 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR
(Institute for Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: October 21, 1958

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24(3)

AUTHORS:

Aleksseyevskiy, M. Ye., Gaydukov, Yu. P. SOV/56-37-3-14/62

TITLE:

The Anisotropy of the Electric Conductivity in the Magnetic Field and the Topology of Fermi Surfaces of Metals

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 672-677 (USSR)

ABSTRACT:

The present paper gives some results of the investigation of the anisotropy of the change of resistance in the magnetic field of monocrystals of Au, Cu, Sn, Pb, Tl, and Ga (which have been investigated already previously (cf. Ref 1)) as well as of Ag, which was investigated for the first time. Most of the metals were investigated on 10 to 15 samples which each showed different orientation of the crystal axes (Determination of the orientation was carried out by G. E. Karstens). The purity of the samples was characterized by the resistance ratio $\rho(300^\circ)/\rho(4.2^\circ)$; it amounted to 10 000 for Sn, Pb, and Ga, to 3000 for Tl, and for Au, Cu, and Ag it was of the order of magnitude 1 000. All measurements were carried out at 4.2°K. The samples were rotated in the constant magnetic field and the angular dependence of the resistance was measured. Figures 1-4 show this dependence for differently

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The Anisotropy of the Electric Conductivity in the SOV/56-37-3-14/62
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orientated Cu, Ag, Pb, and Ga-samples at $H = 23.5 \text{ KOe}$. The orientation (in figures 1,2, which show the angular dependence of the relative change of resistance) and the degree of purity are given. An investigation of the anisotropy of the resistance of silver showed that the resistance in the direction of the minimum (in the rotation diagram) attains a saturation value and that with H it increases exponentially (nearly quadratically) in the direction of the maximum (Fig 5). Similar conditions prevail also in the case of other metals. It is further found that the average relative resistance depends linearly upon H (Fig 6) (Law of Kapitza). The connection of the half-width of the narrow maxima and minima for Au, Cu, Pb, and Sn in the rotational diagram was investigated. It was found that the half-width of the maxima decreases with increasing H (e.g. like $1/H$), and that of the minima at the same time remains constant, which agrees well with the theory (Fig 7, Ref 4). Further investigations were made about the variation of the depth of the minimum in the case of fixed H -direction and varying current direction. Figure 8 shows the result for four different Sn-samples. A stereo-

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The Anisotropy of the Electric Conductivity in the Magnetic Field and the Topology of Fermi Surfaces of Metals SOV/56-37-3-14/62

Graphical projection of special field directions may be carried out from the various data; - an example (for silver) is shown by figure 9. An analysis of the stereographic projections can be carried out by comparing the results obtained by Lifshits and Peschanskiy. Such an analysis may supply information about the shape of the Fermi surface. All data obtained indicate that, contrary to previous opinions, most metals possess closed Fermi surfaces. In conclusion, the authors thank P. L. Kapitza for his interest in this work and Professor I. M. Lifshits and V. G. Peschanskiy for discussions. There are 9 figures and 12 references, 8 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: April 24, 1959

Card 3/3

815.12

S/076/60/034/06/19/040
B015/B061

55310

AUTHORS: Alekseyevskiy, N. Ye., Dubrovin, A. V., Karstens, G. B.
(Moscow)

TITLE: The Use of Mass Spectrometers With Heterogeneous Magnetic
Fields for Gas Analysis

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 6, pp. 1275-1279

TEXT: The use of a heterogeneous magnetic field in mass spectrometry has some advantages. The gas content in samples of bismuth, gold, germanium, zirconium, lanthanum, and various types of copper was determined here. The experiments were carried out in a special glass apparatus (Fig. 2), and a special device (Fig. 1) was used for the introduction of the gases. The gas current was regulated with a bimetal capillary (of ЭМ-69 (EZh-69), or ЭМ-3С (EI-3S) steel). The analysis of the gases separated from the metals was carried out with a glass mass spectrometer (radius: 50 mm), and a metallic mass spectrometer (radius: 152 mm). The spectra were shown up with a self-recording electronic ЭПВ-09 (EPP-09) potentiometer, attached to an ЭМУ-2П (EMU-2P) amplifier.

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The Use of Mass Spectrometers With Hetero-
geneous Magnetic Fields for Gas Analysis

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B015/B061

In order to achieve complete gas separation from the sample, this was melted down in a vacuum by the use of different methods corresponding to the melting temperature of the sample. With samples of a high gas content (e.g. lanthanum), the sample was boiled in an RF-10 (LGZ-10) high-frequency furnace, and the separated gas was diluted in a special collecting device (Fig. 3) by liquid helium. The values obtained (Table) show that 10^{-5} to $10^{-4}\%$ gases were separated from the samples, and thus the gas content in some cases greatly exceeded the content of other impurities. Even smaller quantities of gas can be determined by the method described. There are 3 figures, 1 table, and 4 references: 3 Soviet and 1 American.

ASSOCIATION: Akademiya nauk SSSR Institut fizicheskikh problem
(Academy of Sciences USSR, Institute for Physical Problems)

SUBMITTED: August 8, 1958

Card 2/2

ALEKSEYEVSKY, N.Ye.; MIKHEYEVA, M.N.

Critical currents of superconducting tin films. Zhur. eksp. i teor.
fiz. 38 no.1:292-293 Jan '60. (MIRA 14:9)

1. Institut fizicheskikh problem AN SSSR.
(Superconductivity) (Magnetic fields)
(Tin--Electric properties)

ALEKSEYEVSEIY, N.Ye.; BONDAR', V.V.; POLUKAROV, Yu.M.

Superconductivity of electrolytically deposited copper-bismuth
alloys. Zhur. eksp. i teor. fiz. 38 no.1:294-295 Jan '60.
(MIRA 14:9)

1. Institut fizicheskikh problem AN SSSR.
(Superconductivity) (Copper-bismuth alloys--Electric properties)

85679

S/056/60/038/006/021/049/L
B006/B070

24.7700 (1143, 1145, 1160)

AUTHORS: Alekseyevskiy, N. Ya. Gayukov Yu. P.

TITLE: The Anisotropy of the Electrical Resistance of Mg and Pt
Single Crystals in a Magnetic Field at 4.2°K

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 6, pp. 1720-1722

TEXT: It was shown in Refs. 5 and 6 that the electrical resistance of polycrystalline Mg and Pt specimens in a magnetic field increases without any limit. Therefore, the Fermi surface of these metals is either closed (number of electrons equal to the number of holes) or open. In the first case, the resistance must be practically isotropic in large magnetic fields, and in the second case, strongly anisotropic. The present work was undertaken to clarify this problem for single crystals, the galvanomagnetic properties of polycrystals of Mg and Pt having been studied already. The Mg specimens had a $\rho_{300^\circ\text{K}}/\rho_{4.2^\circ\text{K}}$ ratio of $230 \pm 6\%$; for Pt, this ratio was between 900 and 2400. The results of measurement are

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The Anisotropy of the Electrical
Resistance of Mg and Pt Single Crystals in
a Magnetic Field at 4.2°K

S/056/60/038/006/021/049/XX
B006/B070

shown in diagrams. Fig. 1 shows the polar diagram of the resistance of the Mg single crystal specimen, Fig. 3 that of Pt. Figs. 2 and 4 show the resistance of the specimens of Mg and Pt, respectively, as a function of H, each for two different angles. The fact that for some definite angles the relative change of resistance shows saturation and for others an exponential increase indicates that Mg and Pt have open Fermi surfaces. It may be assumed that Mg, like Tl, has a Fermi surface of the type of a "corrugated" plane, and Pt has one like a "spatial cylinder net".
Academician P. L. Kapitza is thanked for his great interest, and G. E. Karstens for help in the determination of the orientation of the crystals.
Ye. S. Borovik and V. G. Volotskaya are mentioned. There are 4 figures and 7 Soviet references.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR
(Institute for Physical Problems of the Academy of Sciences
USSR)

SUBMITTED: January 29, 1960

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86891

S/056/60/039/005/005/051
B029/B077

24.7700 (1043, 1143, 1557)

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P., Lifshits, I. M.,
Pashchanskiy, V. G.

TITLE: The Fermi Surface of Tin

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 5(11), pp. 1201 - 1214

TEXT: The author starts by analyzing the geometrical conditions of the Fermi surface for tetragonal crystals. The following expression is used for the dispersion law $\varepsilon(\vec{p})$: X

$$\varepsilon(\vec{p}) = A_0 + A_1 \cos \frac{cp_z}{k} - A_2 \cos \frac{cp_x}{2k} \left(\cos \frac{ap_x}{2k} + \cos \frac{ap_y}{2k} \right) - A_3 \cos \frac{ap_x}{2k} \cos \frac{ap_y}{2k} - A_4 \left(\cos \frac{ap_x}{k} + \cos \frac{ap_y}{k} \right).$$

c denotes the lattice constant along the tetragonal axis $[001]$, and a is the lattice constant

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